Poisoning and modifying catalysts. S. Z. Roginskii
(Inst. Phys. Chem., Acad. Sci. U.S.S.R., Moscow).
J. Phys. Chem. (U.S.S.R.) 21, 1143-58(1947)(in Russian).
—A review of the earlier exptl. work (C.A. 41, 1538g)
shows that poisoning and promoting of catalysts by adding
are not as different as believed hitherto. The mechanism
usually postulated for poisoning and promoting cannot
account for the observations. A definite impurity can
either raise or lower the efficiency of a catalyst according
to its amt. The effect of a definite amt. of an impurity
can be pos. or neg. according to conditions. The increase
of efficiency is not always due to a reduction in the activa-
tion energy but may be assocd. with an increased energy of
activation. Catalysts can be modified by adding, not
only poisoned or promoted.   J. J. Bikerman

METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

Statistics of the surface of activated charcoal deduced from the kinetics of activated adsorption. N. P. Keier and S. Z. Roginskii (Acad. Sci., Moscow). *Acta Physicochim. U.R.S.S.* 22, 61–80(1947)(in English); cf. C.A. 39, 5141², 5150⁹; also Langmuir, C.A. 34, 4322¹. Maththeoretical discussion and analysis of extensive exptl. material which proves that the behavior of active charcoals in the activated adsorption of different gases agrees with the conception that the surface of the adsorbent is inhomogeneous with respect to the activation energy. Langmuir's redistribution scheme seems to be invalid in all cases. The expts. were performed with: activated birchwood charcoal; activated sugar charcoal; anthracite recuperation charcoal; charcoal + K_2CO_3; charcoal + KNO_3; charcoal + K_2SO_4; charcoal + Cu acetate; charcoal + Pt, + O_2, + H_2, and + CO. 16 references.
E. P. Hillpern

Mbr., Inst. Physical Chemistry, Dept, Chem, Sci., AS, -1947-

METALLURGICAL LITERATURE CLASSIFICATION

C.A.

A differential isotopic method for the investigation of activated surfaces. N. P. Kaiur and S. Z. Maginshi, Doklady Akad. Nauk S.S.S.R. 57, 157-9(1947); Chem. Zentr. (Russian Zone Ed.) 1948, II, 471; cf. C.A. 42, 3830.—All adsorbed gases were removed from activated sugar C by long heating at 1100°. The C was protected against adsorption during subsequent cooling. H_2 and D_2 at the temp. of liquid air were led over the C in order that adsorption might take place. Desorption was accomplished by slowly raising the temp. The compn. of the gases evolved was detd. by measuring the change in the resistance of a Wollaston filament through which a const. current flowed (exactly 3 ma.). This could be done because the thermal cond. of the gases is a function of their compn. The course of the desorption process was independent of the size of the mols. The gas adsorbed last was evolved first; then a mixt. of H_2 and D_2 was evolved; then the gas adsorbed first was evolved. The results indicate that the phenomenon is one of "energetic inhomogeneity" of the surface (different adsorption areas) rather than one involving spaces of varying accessibility. The adsorption isotherm obtained is similar to that of Freundlich; the distribution function ρ follows clearly the exponential relation $\rho = K e^{-\alpha Q}$, in which Q is the heat of adsorption and α is the coeff. of inhomogeneity.   M. G. Moore

ROGINSKIY, S. Z.

"Absorption and Catalysis on Nonhomogeneous Surfaces," (bk.).
Mbr., Inst. Phys. Chem., Acad. Sci. USSR, c 1948.

B

Electron-Microscopic Structure of Freshly Deposited Precipitates from Solutions. (In Russian.) A. B Shekhter, S. Z. Roginskii, and S. V. Sakharova. *Izvestiya Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk* (Bulletin of the Academy of Sciences of the USSR, Section of Chemical Sciences), Mar.-Apr. 1948, p. 205-207.

It is shown that in case of rapid formation of difficultly soluble precipitates, the first particles have a rounded shape and form a porous network. It seems that such structure is intermediate and thermodynamically unstable. Electron micrographs are presented.

METALLURGICAL LITERATURE CLASSIFICATION

C A

Pressure and concentration isotherms of poisoning of catalysts through blocking. N. Z. Kuginskii. *Invest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1946, 383-98); cf. C.A. 42, 32016. 7th ed.)—The formal statistical theory of the dependence of the activity A of a catalyst on the equil. pressure e of the poison in the vol. is developed for a heterogeneous surface, and ordered distribution of the poison over the surface. (1) In the case of an antibatic correlation between the activation energy E of the chem. reaction and the heat of adsorption Q of the poison, i.e. when blocking begins at the most active points of the surface, if the correlation is of the simple form $E = E_{max} - \gamma Q$, the dependence of A on e is of the form $A(e) = A_0/e^m$, where $m < 1$; m and A_0 vary with the temp. At a const. temp., the shape of the concn. isotherms is independent of the type of the distribution function $\rho(E)$, whether exponential, algebraic, or uniform. With varying temp., m varies significantly only in the case of exponential distribution; in that case, the temp. dependence of A should also show systematic deviations from the Arrhenius relation. For any nonexponential distribution, isobars and isotherms of A are exponential functions of the temp. An antibatic but nonlinear (e.g. quadratic or exponential) relation between E and Q leads to more complex isotherms which are very sensitive to the particular relation adopted. Generally, the faster the fall of E with increasing Q, the more marked is the dependence of A on e, and an equal. data, of the variation A(e) may, in principle, lead to the establishment of the relation between E and Q. Pending more ample equal. data, the linear antibatic relation between E and Q is a sufficient approximation for that type of correlation. (2) If E and Q are symbatic, i.e. when blocking begins at the least active points, and spreads gradually in the direction of the controlling prae. A first remains inappreciable over a wide range of e. Poisoning begins to become noticeable, and to increase sharply with e, when the blocking has reached points with E about 1.5 RT distant from E_{min}. N. Thon

$C A$

2

Poisoning of catalysts through blocking in uncorrelated adsorption of the poison. S. Z. Roginskii. *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1948, 493-802; cf. *C.A.* 43, 7606d.—In uncorrelated adsorption, i.e., in the case when the consecutiveness of the adsorption is independent of the distributions $\rho(E)$ and $\rho(b)$, of the chem. reaction activation energy E and rate const. b over the nonhomogeneous catalyst surface, the catalytic activity A, defined by $A = \int \rho(b) b db$ (integrated between the min. and the max. b), is expressed by $A = A_0 [1 - (\Gamma/\Gamma_0)]$, (where Γ = amt. of poison adsorbed, Γ_0 = max. amt. on complete poisoning), and the ratio $\lambda = A/A_0 = 1 - \gamma\Gamma$. The absence of a correlation may be due either to the absence of a correlation between E and the heat of adsorption Q of the poison, or else to a mechanism whereby the poison distributes itself without regard to E, despite the existence of a functional relation between E and Q. An example of one such mechanism, occurs in the poisoning by O_2 of the hydrogenation of C_2H_4 on Cu (Russell and Ghering (*C.A.* / 30, 2002²); H. S. Taylor (*C.A.* 34, 4668³)) where the order of poisoning is detd. solely by gradual penetration and zonal spreading of the catalyst. Another possible source of uncorrelation is the absence of desorption and lateral mobility on the surface. In terms of the partial pressure v of the poison, in the absence of a correlation between E and Q, if the surface is homogeneous with respect to adsorption of the poison, the function $y = 1 - \lambda$, expressing the loss of catalytic activity due to the poisoning, is of the Langmuir form $y = av/(1 + av)$, i.e., indistinguishable from a surface homogeneous

with respect to E. If the surface is heterogeneous with regard to Q, the $\Gamma(v)$ isotherm, depending on whether the $\rho(Q)$ distribution function is exponential, or a power of Q, or uniform, is of the form $\Gamma \simeq av^{1/n}$, or $\Gamma^{1/n} \simeq a \ln v + C$ or $\Gamma = a \ln v + C$, resp., and the y function, $y \simeq a_1 v^{1/n}$, or $y \simeq (a \ln v + C)^n$, or $y \simeq a_1 \ln v + C$, resp., with the corresponding evident expressions for λ. Thus, comparison of the wt. and concn. isotherms should permit the establishment of the character of the adsorption of the poison. In terms of the temp., the independence of the poison distribution of that of E leads to $\lambda(T) = $ const., irrespective of the source of the linear poisoning law, and the change of A with the temp. is due only to the change of A_0, mostly of the exponential form. Isotherm of poisoning are derived from the isotherms, for the case of a homogeneous surface, and a nonhomogeneous surface with an exponential, power, or uniform distribution of Q. In the 1st case, $\lambda^{-1} - 1 = a_0 v e^{Q/RT}$, or $a_0 v e^{Q/RT}$ in the case of dimers.; as $Q = $ const., $\ln y/\lambda = (C'/T) - C$. In the 3 latter cases, $\ln y = C_0 - C_1 T$, or $y^{1/n} = C_1 - C_1 T$, or $y = C_1 - C_1 T$, resp.

N. Thon

USSR/Chemistry - Catalysts, Prepara-   May/Jun 48
            tion of
    Chemistry - Catalysis

"Information on Active Surfaces and the Theory of
Preparing Catalysts," S. Z. Roginskiy, $9\frac{1}{2}$ pp

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 3

Roginskiy's reply to two articles by Dankov and
Frost: his work has been so distorted in these
articles, that he has to preface his reply with a
short statement of the results of his experiments.
Refutes accusation of not using models and em-
piricism. Discusses dispersion, catalyst prep-
aration, and supersaturation.

                                            7/49T15

ROGINSKIY, S. Z.

PA 8/49T12

USSR/Chemistry - Catalysis
Chemistry - Catalysts, Poisoning of
Jul/Aug 48

"Baric and Concentration Isotherms of the Poison-
ing of Catalysts by Blocking," S. Z. Roginskiy,
Inst Phys Chem, Acad Sci USSR, 7½ pp

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 4

Starting with a model of nonuniform surface,
Roginskiy develops static theory of relation
between activity of contacts and equilibrium pres-
sure of the poison, with regulated distribution of
the poison along the surface. The equations for
the basic isotherms of poisoning, in the antibatic
condition F_{ur} and q_{ADS} of the poison, are not

8/49T12

USSR/Chemistry - Catalysis (Contd)   Jul/Aug 48

sensitive to the type of distribution, but extremely
sensitive to the K and Q type of relation. In the sym-
batic condition F_{ur} and q_{ADS} of the poison, poison pres-
sure zones appear, within whose limits transition be-
tween practical independence and well-defined sensitivity
occurs. Basic rules of poisoning in the control strip
are given. Submitted 28 Aug 1947.

8/49T12

ROGINSKIY, S. Z.

Activated adsorption as a method of studying catalysts.
S. Z. Roginskii. *Problemy Kinetiki i Kataliza, Akad. Nauk.*
S.S.S.R. Inst. Fiz. Khim. 5, *Metody Izucheniya Kataliza-*
tora 258-73(1948).—A review with 25 references.
Gladys S. Macy.—

ROGINSKIY, S. Z.

PA 27/49T37

USSR/Chemistry - Catalysis   Sep/Oct 48
      Chemistry - Catalysts, Poisoning of

"Poisoning of Catalysts by Obstruction Due to Non-
correlated Absorption of Poison," S. Z. Roginskiy,
Inst Physicochem, Acad Sci USSR, 10 pp

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 5

Finds that gravimetric isothermals of poisoning are
no different than isothermals of poisoning of
homogeneous surfaces. For heterogeneous surfaces,
obtains characteristic concentrated isothermals,
different for different functions of distribution of
surface sections according to heats of adsorption of
the poison. Submitted 30 Aug 47.

                                          27/49T37

ROGINSKII, S.Z.

Jan/Feb 1948

"Review of 'Photochemistry of Dyestuffs and Allied Organic Compounds' by A.N. Terenin,"
S.Z. Roginskiy, 1 1/2 pages.

"Uspekhi Khimii" Vol. XVII, No. 1

Valuable addition to Soviet as well as international physical chemical literature.
Gives clear picture of work, achievements and knowledge of chemical action of light.
Also mentions various fields worthy of further immediate study. Published in 1947.

Ca

2

Poisoning of a catalyst by blocking. S. Z. Roginskii (Inst. Phys. Chem., Acad. Sci. U.S.S.R., Moscow). J. Phys. Chem. (U.S.S.R.) 22, 655-67(1948).—Adsorption of a poison on an inhomogeneous catalyst surface can have various effects on the activity of the catalyst. The 3 main types are (1) equal adsorption on spots of different activities; in this case the surface appears homogeneous; (2) preferential adsorption on the most active spots; the activity of the catalyst is greatly reduced by small adsorbed amts.; and (3) preferential adsorption on the least active spots; small adsorbed amts. affect the activity little but great amts. suppress it.   I. I. Bikerman

METALLURGICAL LITERATURE CLASSIFICATION

C A

2

Blocking of catalysts at a correlated distribution of the catalyst poison. S. Z. Roginskii, J. Phys. Chem. (U.S.S.R.) 22, 609-615(1948). cf. preceding abstr.—If the adsorption of the poison on a given surface spot depends on the catalytic activity of this spot, the effect of the poison is a function of this dependence. Various instances are treated mathematically.   J. J. Bikerman

A S B - S L A   METALLURGICAL LITERATURE CLASSIFICATION

ROGINSKII, S. Z.

USSR/Chemistry - Supersaturation   Nov 48

"Experimental Proof of the Theory of Supersaturation:
III, Low-Temperature Oxidation Reactions on Nickelous
Oxide," S. Z. Roginskiy, T. F. Tselinskaya, Inst
of Physicochem, Acad Sci USSR, Moscow, 13½ pp

"Zhur Fiz Khim" Vol XXII, No 11

Shows that an increase in the pyrolytic process
of decomposition of nickel carbonate greatly
affects catalytic activity of nickelous oxide, a
fact attributable not to change in specific area
quantity but rather to a change in the nature of

PA 56/49T25

USSR/Chemistry - Supersaturation (Contd)   Nov 48

the area. Activity was continuous and increased
along with an increase in △ F. Optimum point
of supersaturation was not determined. Submitted
12 Jul 47.

56/49T25

56/49T25

ROGINSKIY, S. Z.

4

Statistical theory of the adsorption of mixtures. S. Z. Roginskiĭ and O. M. Todes. *Problemy Kinetiki i Kataliza T., Statist. Yavleniya v Geterogen. Sistem., Akad. Nauk S.S.S.R.* 336-58(1949).—The theory which was developed is useful for the adsorption of mixts. on the usual tech. adsorbents (active C, silica gel, etc.). It permits detn. of the effect of one gas on the distribution boundary occupied by a 2nd gas. In analyzing the reaction rate on complex surfaces, the position of this boundary dets. the value of the activation energy and in some cases the law for the shift of the boundary with a change in pressure dets. the kinetic law for the process. The probable ratio for the heat of adsorption of different gases on the same regions of a complex surface for different types of adsorption forces was detd. The adsorption isotherms for the individual components and the total adsorption for the binary mixt. were detd. by the method of the controlling strip. The effect

of temp., external pressure, and compn. of the gas phase on the adsorption equil. was established.   J. R. L.

ROGINSKIY, S.Z.

The properties of broadly heterogeneous surfaces as shown by the study of the adsorption of oxygen and hydrogen on activated charcoal. N. P. Keier and S. Z. Roginskii. *Problemy Kinetiki i Kataliza v Statisticheskie* (*Tenya v Geterogen. Sistemakh* 410-35(1949); cf. *C.A.* 42, 3638c. —A statistical study of broadly heterogeneous surfaces on which the heats of adsorption and faces, that is surfaces cover a broad range of values, leads to the heats of activation of a series of equations that fit the data for the development of O_2 and H_2 on activated C. The energy of adsorption for H_2 adsorption is greater than for the ad-activation of O_2. The effect of admixts. was also studied. sorption of O_2.   J. Rovtar Leach

ROGINSKIY, S.Z.

"The Structute of Solutions and the Mechanism of Homogenous Catalysts After investigation with Halogens." Iz. Ak. Nauk USSR, Ot. Khim. Nauk, No. 1, 1949.
Inst. of Chem. Phys., Lab. of Catalysis, Leningrad, -1940-.

ROGINSKIY, S.Z.

Principles of catalyst theory. S. Z. Roginskii. *Problemy Kinetiki i Kataliza, Akad. Nauk S.S.R. 6, Geterogennyi Kataliz,* 1-53(1949).—Surface-catalytic processes can be classified as follows: (1) semiconductor (zonal) catalysis, where adsorbed substances interact with the easily excitable electrons of the solid semiconductor catalyst; (2) cationic catalysis, where the important factor is deformation of adsorbed mols. by elec. fields of ions of solids; (3) catalysis by substances that form polar-bond mol. compds.; in this type, there is no sharp distinction between the homogeneous and heterogeneous catalysis; (4) catalysis by paramagnetic substances in reactions such as ortho-para H conversion, where the limiting factor is not an activation energy in its usual sense, but rather there is a quantum-mech. limitation; (5) cohesion catalysis in adsorbed liquid films, where the acceleration is simply because of an increase of the concns. of reactants by condensation in the liquid film, without a considerable change in the state and structure of the reactant mols. Addnl. specific effects arise from a frequent necessity to match the geometrical-elec. structure of the catalyst to the shape and structure of the adsorbed mols. Inadequacy of purely phys. concepts of structure of an active surface becomes apparent when the effect of addns. to the catalysts on the activity of catalysts is considered. The same addns. that enhance activity, can also suppress it, depending on their concns. and temp. The addns. can change the activation energy E and the pre-exponential factor K_0.

For the effects caused by the addns. the following nomenclature is proposed: (1) the term "poisoning" should be applied only to the cases where a part of the surface becomes blocked, so that K_0 decreases at const. E; or K_0 changes only slightly, whereas E increases; (2) the term "promotion" should be applied only when the no. of the active centers is increased without changing their assortment, so that K_0 increases, or new active centers with low E are created; (3) the term "modification" should be applied when both K_0 and E change substantially, whether E increases or decreases. Very frequently a decrease in E is accompanied in a parallel manner by an increase in K_0. For the semiconductor-type catalysts, this is paralleled by similar changes in elec. conductivities, and is explained by the cond.-zone theory. With respect to the capture of addns. by the catalysts, distinction should be made between the colloidally and molecularly dispersed additives. From the standpoint of the theory of supersatn., the catalyst activity, derived from the surplus free energy, should increase if it is prepd. under conditions far removed from the equil. conditions. This surplus energy is not used up in the catalysis process; thermodynamically unstable structures may become stable in certain catalytic systems. In spite of some formalism of the supersatn. theory, its application in prepn. of some catalysts has resulted in improved actř. ities. 80 references.   Andrew Dravnieks

ROGINSKIY, S.Z.

The use of the electron microscope for the study of statistical properties of active solid substances. S. Z. Roginskii. Problemy Kinetiki i Kataliza 7, Statist. Yavleniya v Geterogen. Sistem. Akad. Nauk S.S.S.R., 72-88(1949).—The use of the electron microscope for the study of statistical values encountered in catalysis is described. The electron microscope makes possible the statistical study of the distribution of

particles, pores, and projections which characterize the structure and the topography of complex systems. This opens an entirely new field in the study of the topography of topochem. reactions which are important in the genesis of catalysts, the distribution of an active material on a carrier, and the changes in this distribution upon heating and upon use. It also allows the study of changes in the structure of catalysts upon being used. R. points out possibilities of using this method.   J. Rovtar Leach

ROGINSKIY, S. Z.

The limits of applicability of statistical methods in the analysis of adsorption phenomena. S. Z. Roginskii and O. M. Todes. Problemy Kinetiki i Kataliza 7, Statist. Yavleniya v Geterogen. Sistem:, Akad. Nauk S.S.S.R., 248-02(1949).—Adsorption, kinetic, and heat measurements for adsorption on a surf: :e show significant deviation from the Langmuir equation which was developed with the assumption that the surface is homogeneous and that there is no interaction of the adsorbed mols. In order to evaluate the effect of surface heterogeneity, it is necessary to det. the primary distribution of points on the surface with respect to the heat of adsorption or activation energy. This can be done from known summary relationships e.g., adsorption isotherms and kinetic curves for activated adsorption, etc. Mathematically this requires the solution of certain 1st order integral equations. Approx. methods for the solution of this statistical problem were proposed (the method of the controlling strip which is developed further here). However, the lack of precise data and certain defects in this method do not allow precise calcn. for specific sorbents. However, the method of the controlling strip can be used to represent several important phenomena in adsorption and heterogeneous catalysis. A series of qual. relationsh'ps were deduced for these phenomena which depend on the heterogeneity of the surface with respect to energy, and the nature of the heterogeneity (i.e., the distribution function) could be approximated. This theoretical analysis shows that the solution of the basic statistical problem in adsorption requires its own math. development. The form of the distribution function can be obtained, with some degree of precision, only in a given, narrow interval for the heats of adsorption.   , Ruvter Leach

ROGINSKIY, S.Z.; TODES, O.M.

Statistical theory of the adsorption of mixtures. Probl. kin.i kat.
7:336-359 '49.   (MLRA 9:9)
(Adsorption) (Thermal analysis) (Distribution (Probability theory))

KEYER, N.P.; ROGINSKIY, S.Z.

Properties of largely inhomogeneous surfaces resulting from studying
the adsorption of oxygen and hydrogen on active carbons. Probl.kin.i
kat. 7:410-435 '49.   (MLRA 9:9)
(Adsorption) (Carbon, Activated)

ROGINSKIY, S. Z.

PA 48/49T15

USSR/Chemistry - Catalysis   Jan 49
    Chemistry - Electron Microscope

"Study of the Surface of Working Contacts by
Electron Microscope: I. Applying the Method of
Shaded Replicas to the Study of Variations in
Contacts Under the Influence of a Catalyzable
Reaction," S. Z. Roginskiy, I. I. Tret'yakov,
A. B. Shekhter, Inst of Physicochem, Acad Sci
USSR, Moscow, 7 pp

"Zhur Fiz Khim" Vol XXIII, No 1

Analyzes possible mechanisms of changes of sur-
face of catalyzer during heterogeneous catalysis.
Studies of such changes enable clarification of
                                              48/49T15

USSR/Chemistry - Catalysis (Contd)   Jan 49

working mechanism of catalyzer and structure of
active surface. Method of "shaded replicas" is
used to study these changes. Abrupt change is
noticed in structure of palladic catalyzer dur-
ing formation of water from detonating gas.
Gives 13 microscopic photos of surface changes,
table on ridges and depressions of surface, and
diagram of a device for hydrogen oxidation.
Submitted 18 May 48.

48/49T15

CA

Kinetics of desorption of hydrogen adsorbed in an activated process. N. P. Keier and S. Z. Roginskii. Zhur. Fiz. Khim. 23, 997-016(1949); cf. C.I. 47, 3635d.—H₂ was adsorbed on sugar charcoal (I); then the pressure above I was lowered to 10^{-4} mm. Hg, and the amt. D (expressed as sq. cm. bared by desorption) desorbed was detd. at different times t. Between 510 and 565°. $D^{1/t} = b(RT \ln t - RT \ln \tau - E_0)$. T is abs. temp., t is a const. (e.g. -22), and E_0 is another const. (e.g. 32,000 cal./mole). This equation results when the area of having a definite desorption energy E is $A = b(E - E_0)^t$. If desorption is stopped before complete degassing and more H₂ is added, this is adsorbed more rapidly than during the "primary" adsorption; this shows that desorption does not start from patches most active in adsorption. If the adsorption of H₂ is stopped before equil. is attained, the temp. is raised (565 → 650°) for an hr. and again lowered to 565°, the adsorbed amt. is greater than it would have been at a const. temp. of 565°; presumably at 660° H₂ mols. migrate from patches of a small adsorption energy E_1 to patches having a greater E_1. Repeated adsorption-desorption cycles at 565° are reproducible. When D₂ is brought into contact with I, it exchanges with the 0.5–0.7% H₂ present in I, so that adsorption of D₂ cannot be measured. The relation between E and E_1 is discussed.
                                                                J. J. Bikerman

Инст. Физ. Хим.
Москва, Акад.
Наи. USSR, с 1949-

Electron-microscopic study of the surface of working catalysts. II. Change of the surface of palladium during catalytic oxidation of hydrogen. N. L. Raginskii, I. I. Tret'yakov, and A. B. Shekhter. Zhur. Fiz. Khim. 23, 1152-60(1949); cf. C.A. 43, 4087b.—Electron photomicrographs (shadow replicas method) of Pd plates are not altered by treating Pd with O or H₂O. Heating in H at 175° causes change in gloss of the Pd plates but almost no alteration in the electronograph. When Pd is used as catalyst (the conditions of expt. are not given), its surface becomes pitted, the depressions being of very different dimensions; after long usage, the surface appears etched. The nonuniformity of structure changes shows that the catalytic activity of the surface varies from spot to spot.   J. J. Bikerman

Dynamics of desorption. S. Z. Roginsky and M. I. Yanovsky (C. R. Acad. Sci., URSS. 1940, 66, 879—882).—The expression $V/s = Mf'(c).(1-c/C)$ applies to desorption of CO_2, C_2H_4, or C_2H_6 from active C contained in a tube through which air is being passed, where V is vol. of air passed, s is distance in cm. from the point of entry of the air to the section of adsorbent taken for analysis, M is wt. of sorbent per unit length of tube, $f'(c) = df(c)/dc$, where $f(c)$ is the adsorption coeff., c the concn. of unadsorbed gas, and C the sum of adsorbed and unadsorbed gas per unit length of layer. At low concns. $c/C = 1$, and the expression becomes $V/s = Mf'(c)$.

R. Truscoe.

A S M - S L A   METALLURGICAL LITERATURE CLASSIFICATION   E-2

ROGINSKIY, S. Z.

PA 54.49T107

Jul 49

USSR/Physics
Solid State
Catalysts

"Relationship Between the Electronic Properties of a
Solid and Its Catalytic Capacity," S. Z. Roginskiy,
Corr Mem, Acad Sci USSR, 2½ pp

"Dok Ak Nauk SSSR" Vol LXVII, No 1

Side by side with catalytic reactions accelerated
by solids (generally nonferrous), observed group
reactions such as isomerization or cracking of
hydrocarbons. Among contacts catalyzing these
reactions were solids in an electric relationship
with dielectrics or poor conductors. Nonferrous
oxides and sulfides and metals may, in this respect,
have catalytic capacity, but do not surpass ferrous
compounds in other respects.

54/49T107

ROGINSKY, S.Z.; SHEKHTER, A.B.; YECHEISTOVA, A.I.; KAFTARADZE, N.N.; KUSHNEREV, M.Ya.

Electron microscope study of hehydration of crystal hydrates. C.R. Acad. Sci.
U.R.S.S., '49, 68, 879-880.
(BA - A I Ja '53:81)

CA

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Investigation of the heterogeneity of active surfaces by the differential isotope method. I. The active surface of metallic nickel and of zinc oxide. N. P. Keier and S. Z. Roginskii. *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1950, 27 (M).—The heterogeneity of the surface of an active Ni catalyst, prepd. by compression of Ni grains of 1.0–2.0 mm. diam. (by reduction of NiO in a stream of H_2 at 280°), sp. surface area 1.5–2 sq.m./g., was demonstrated by expts. of consecutive adsorption, at room temp., of H_2 and of D_2, or 1st of D_2, then of H_2, and thermal-conductivity analysis of the gas given up in fractions on desorption at increasing temps. Prior to the adsorption expts., 1.05-g. samples of the catalyst were outgassed at up to 680° under 10^{-6} mm. Hg, reduced once more with H_2 at 680°, and again outgassed at 530°. Between the 2 adsorptions, the catalyst was evacuated 1.5 min. to 10^{-4} mm. Hg, then the 2nd gas admitted. Data for a typical run are: 1st adsorption, D_2 under 1.48 mm. Hg, amt. adsorbed in 9 min. at room temp., 0.095 cc. (S.T.P.); after short evacuation, 2nd adsorption, H_2 under 3.08 mm. Hg, amt. adsorbed in 9 min. at room temp., 0.04 cc., followed by 1.5 min. evacuation; percentages of D_2 and of H_2, resp., in the gas desorbed: at room temp., 5 and 95; at 3–45°, 0 and 100; at 170–230°, 0 and 100; at 300–20°, 40 and 60; at 690–70°, 95 and 5; at 520°, 100 and 0; at 530°, 100 and 0. Consequently, the isotope adsorbed first is desorbed last. The same is observed in analogous runs with the order of the 2

adsorptions reversed, i.e. 1st H_2, then D_2. In these expts., the surface coverage is of the order of 5–10% of the total surface area. No sp. effects due to the chem. difference between H_2 and D_2 are observed. The conclusion is that active spots on the surface of Ni differ in their heats of adsorption and activation energies, and that there is no mixing of the mols. adsorbed on the surface. A gas of mixed compn. is obtained only in desorption in an intermediate temp. range, which indicates limited mobility of the mols. in the adsorbed layer. On the basis of this finding, the exponential kinetic law established by Elovich and Zhabrovaya (C.A. 38, 379?) for the rate of adsorption of H_2 is rooted not in repulsive interaction between the adsorbed mols., but solely in the heterogeneity of the adsorbing surface. Analogous expts. were made with ZnO, prepd. by oxidation of Zn in the elec. arc, and outgassable at up to 500° without decompn.; decompn. is noticeable only above 600°. On adsorption of H_2, the gas liberated

In desorption at up to 500° is pure H_2; reaction between H_2 and HdO takes place only above 500°, and then even under a pressure as low as 0.6×10^{-4} mm. Hg. If the 2 consecutive adsorptions are accomplished above 500°, only the gas adsorbed last is given up on heating; the isotope adsorbed first appears to have been spent. In room temp. adsorption, the 2nd adsorbed gas is found very weakly, and most of it is desorbed in the 1-h min. evacuation at room temp. which precedes the high-temp. desorption. Consequently, only the isotope adsorbed 1st is found in the gas desorbed on heating. This indicates that, under these conditions, only a very minor fraction of all active points possesses a high binding power for the adsorbed mols., and these points are completely filled by the gas adsorbed first. This situation is changed when the 1st adsorption is done at 500°. Thus, with D_2 adsorbed first under 6.15 mm. Hg, 50 min. at 500°, followed by slow 16-hr. cooling to room temp., the amt. of D_2 adsorbed was 0.2 cc. (S.T.P.); after short evacuation, H_2 was adsorbed under 6.65 mm. Hg, 34 min. at 115°, amt. adsorbed 0.024 cc.; the compn. of the gas given up on subsequent desorption, at 170-295°, 300-325°, 395-450°, 487-498°, was ($\%$ D, and H_2), 15 and 85, 25 and 75, 50 and 50, 75 and 25%. Under these conditions, the gas adsorbed last is given up first, as in the case of Ni.

N. Thon

ROGINSKIY, S.Z.

Chemical Abstracts
Vol. 48 No. 5
Mar. 10, 1954
General and Physical Chemistry

The theory of chromatographic processes on nonhomogeneous surfaces. S. Z. Roginskii and M. I. Yanovskii. Issledovaniya v Oblasti Khromatog., Trudy Vsesoyuz. Soveshchaniya Khromatog., Akad. Nauk S.S.S.R., Otdel. Khim. Nauk 1950, 46-55(Pub. 1952).—See C.A. 47, 10310i.
G. M. Kosolapoff

B

2 C

Kinetics of Contact Reactions. II. Processes Taking Place on Nonuniform Surfaces. (In Russian.) V. I. Levin and S. Z. Roginskii. *Izvestiya Akademii Nauk SSSR* (Bulletin of the Academy of Sciences of the USSR). Section of Chemical Sciences. Mar.-Apr. 1950. p. 137-151.

Possible relations between different energy parameters of the surface were investigated. Formulates basic premises of the statistical theory of contact processes on nonuniform surfaces and indicates the main types of kinetic equations to be used depending on correlation between above parameters. 2N ref.

A S A   S L A   METALLURGICAL LITERATURE CLASSIFICATION

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127

Kinetics of the thermal decomposition of solid permanganates. S. Yu. Elovich, B. Z. Raginskii, and K. I. Shmuk (Inst. Phys. Chem., Acad. Sci. U.S.S.R., Moscow). Invest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk 1956, 460-74.— The kinetic curves of evolution of O_2 from the solid permanganates investigated have the usual S shape, and the rate passes through a max. The "decompn. temp." t is defined, conventionally, as the temp. at which the max. rate of decompn. is reached in 120 min. Exptl. values of this conventional t are (MnO_4 omitted): Li 100, Na 155, K 265, Cs 90, Rb 280, Ag 100, Ca 260, Be 60, Mg 130, Ca 145, Zn 80, Sr ~185, Cd 100, Ba 170, Ni 100°. Within any one group of the periodic system, t increases systematically with the at. wt. of the cation of the permanganate, i.e. with increasing at. radius r. As between permanganates with cations of close r, higher t is assocd. with lower ionic charge e. Consequently, the ease of the decompn. of the MnO_4^- anion is detd. by the e/r value of the cation, i.e. by its electrostatic field potential. Cations with an unfilled inner electron shell have a sp. effect. Thus, among the univalent cations, Ag^+ lowers t of the permanganate by 126° as compared with $KMnO_4$, and among the bivalent ions, $Cd(MnO_4)_2$ and $Ni(MnO_4)_2$ have $t = 80$ and 100°, resp., as compared with 130-140° for Ca and Mg. Perman-ganates of Zn and Cd behave like the permanganates of the transition elements. These effects of the nature of the cation on the ease of decompn. of the anion in the solid salt parallel similar effects in azides, formates, and oxalates.

N. Thon

CA

2

Topography of the pyrolytic decomposition of barium permanganate. S. Z. Roginskiĭ, E.I. Shmuk, and M. Ya. Kushnerev (Acad. Sci. U.S.S.R., Moscow). *Invest. Akad. Nauk S.S.S.R., Odel. Khim. Nauk* 1960, 573-5.—Crystals of Ba(MnO₄)₂, having undergone beginning thermal decompn., were carefully dissolved in a drop of H₂O under the microscope; this operation leaves an undissolved superficial solid film (product of the decompn.) which appears to be an exact replica of the surface of the original crystal. Under a magnification of X 500, the film is seen to be highly porous. Under the electron microscope (X 16,000), the film is amorphous, nearly transparent, but covered with isolated dark spots, mostly near the edges of the original crystal, rarer in the middle of the face, but not in any way preferentially located near corners. X-ray patterns confirm the amorphous structure. By gas adsorption, the sp. surface area S is of the order of 6 sq. m./g. Thus, the solid product consists of a multitude of amorphous or at most cryptocryst. grains sepd. by a system of pores and channels. At the end of the process, the whole crystal becomes a loose aggregate of grains. If the original crystal (~ 1 mm. in size) has disintegrated into N grains of total surface area NS, the mean diam. of a grain can be estd. to ~ 10⁻⁵ cm., and their total no., from one original crystal, to about 10¹⁸. The process of decompn. can be pictured as starting with the formation of a highly permeable amorphous film. This film grows from initial centers of decompn. at the surface and spreads into the bulk of the crystal. No single grain of the amorphous solid product grows to any appreciable size. Rather, the amt. of the product increases by way of multiplication of the no. of the tiny grains, and the boundary between the rind, consisting of a large no. of individual grains, penetrates increasingly deeper into the crystal.   N. Thon

ROSINSKIY, S.Z.

CATALYST

Chemical Abst.
Vol. 48 No. 9
May 10, 1954
General and Physical Chemistry

Theory of chromatography on heterogeneous surfaces. S. Z. Rosinskii and M. I. Yanovskii. Trudy Moskov. Inst. Khim. Mashinostroeniya 1950, No. 2(Whole No. 10), 79-85; cf. C.A. 47, 10310i.—By analogy with analysis of adsorption on homogeneous surfaces, R. and Y. write for chromatography on heterogeneous surfaces (over a restricted range of concn. change): $\rho(Q) = CV/MRT$, where $\rho(Q)$ is the distribution function for heat of adsorption Q. C is concn. at the time vol. V has passed through a bed of length x contg. M g. of packing per unit length.

H. J. Kandiner

ROGINSKIY, S. Z.

"New USSR Data on the Mechanism of Chemical Reactions in the Solid Phase and
Their Significance for the Preparation of Catalysts," Iz. Ak. Nauk SSSR, Otdel.
Tekh. Nauk, No.4, p.444, 1950

Remarks   W-15036, 7 Nov 50

CA

2

Desorption of gases in dynamic conditions. S. Z. Roginskiĭ and M. I. Yanovskiĭ (Acad. Sci. U.S.S.R., Moscow). Zhur. Fiz. Khim. 24, 137-43(1950).—Mixts. of air with CO_2, ethylene (I), or propene (II) were passed at 20° through 4 tubes filled with activated C (bulk d. 0.47, particle size 1.5-2.75 mm.) until the outgoing gas had the concn. of the incoming gas (approx. 0.012 mol./l.). Then pure air was slowly (a few cc./min.) forced through the 4 tubes and 4 addnl. tubes, equally filled, all in series, and the concn. c of the admixt. in the air was detd. after every tube as function of the vol. V cc. that passed through. The rate of displacement increased from II to I to CO_2; e.g., the concn. after the 4th tube became 0.002 mol./l. after V = 4500, 2500, and 1000, resp. At a given (large) V, c increased gradually from the 1st to the 6th or 7th tube and then rapidly decreased to zero. The adsorption zone increased with V. The adsorption isotherms of CO_2, I, and II on C were detd. up to 0.04 mol./l. Assuming that the outgoing air was in equil. with the amt. adsorbed, a was calcd., and the calcn. confirmed by detg. a in the N tubes by complete displacement of the admixt. with N_2 at 350-400°. The equation $V/XM = (da/dc)\{1-(c/c_0)\}^2$ was valid; X is the distance from the inlet, M the amt. of adsorbent per cm. of the column, and c_0 is the total concn. of air and admixt.

J. J. Bikerman

ROGINSKIY, S. Z.

PA 192T16

USSR/Chemistry - Catalysis   Jul/Aug 51

"Experimental Verification of the Statistical The-
ory of Catalyst Poisoning. Communication 1. Poi-
soning of Nickelous Oxide With Boric Acid," S. Z.
Roginskiy, N. I. Element, Chair of Phys Chem, Mos-
cow Inst of Chem Equipment Constr

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 4, pp 350-360

Investigated poisoning action of H_3BO_3 on NiO cat-
alyst used in reaction of deep oxidation of iso-
octane and obtained isotherms of reaction rate
const against wide range of amt of poison for
temps between 3700 and 5500 C. Activation energy

                                                        192T16

USSR/Chemistry - Catalysis (Contd)   Jul/Aug 51

increased as greater amt of boric anhydride en-
tered catalyst surface. Results indicated that
blocking of surface, which had wide range of local
activation energies, caused poisoning, and that
surface was very nonhomogeneous. Investigation
proved for 1st time applicability of statistical
theory of poisoning to highly nonhomogeneous sur-
faces.

                                                        192T16

4522

D. I. MENDELEEV'S VIEWS ON THE INEVITABILITY OF MASS CHANGES DURING TRANSMUTATIONS OF ELEMENTS. S. Z. Roginskii, Uspekhi Khim. 20, 270-2(1951) May-June. (In Russian)

It is pointed out that in a paper, "The Periodical Regularity in Chemical Elements," published in 1872 (Ann. Chem. u. Pharm., Suppl. 8, No. 2, 133-229), Mendeleev explained the fractional differences between atomic masses as due to losses of mass accompanying the formation of heavy atoms from lighter ones and expressed the opinion that mass should be considered as a form of energy. The first formulation of these ideas is currently ascribed to Crookes (address delivered in Sheffield, England, in 1874).

(CA 48 no.2: 415 J4)

ASb-SLA METALLURGICAL LITERATURE CLASSIFICATION

LOGINSKIY, S. Z.

Periodicheskaia sistema elementov D. I. Mendeleeva v svete poslednikh issledovanii
/D. I. Mendeleev's periodic system of the elements in the light of recent research/.
Moskva, "Znanie," 1952. 30 p. (Vsesoiuz. o-vo po rasprostraneniiu polit.
i nauch. znanii)

SO: Monthly List of Russian Accessions, Vol. 7, No. 3, June 1954.

DUBININ, M.M., akademik, otvetstvennyy redaktor; GAPON, Ye.N.; GAPON, T.B.;
ZHYPAKHINA, Ye.S.; RACHINSKIY, V.V.; BELEN'KAYA, I.M.; SHUVAEVA, G.M.;
ROGINSKIY, S.Z.; YANOVSKIY, N.I.; FUES, N.A.; KISELEV, A.V.; NEYMARK, I.Ye.;
SLINYAKOVA, I.B.; KHATSET, F.I.; LOSEV; I.P.; TROSTYANSKAYA, Ye.B.;
TEVLINA, A.S.; DAVANKOV, A.B.; SALDADZE, K.M.; BRUMBERG, Ye.M.; ZHIDKOVA,
Z.V.; VEDENEEVA, N.Ye.; NAPOL'SKIY, S.A.; MIKHAYLOVA, Ye.A.; KAZANSKIY, B.A.;
RYABCHIKOV, D.I.; SHEMYAKIN, F.M.; KRETOVICH, V.L.;BUNDEL', A.A.; SAVINOV,
B.G.; VENDT, V.P.; EPSHTEYN, Ya.A.

[Research in the field of chromatography transactions of the All-Union
Conference on Chromatography, November 21-24, 1950] Issledovaniia v oblasti
khromatografii; trudy Vsesoiuznogo soveshchaniia po khromatografii, 21-24
noiabria 1950 g. Moskva, Izd-vo Akademii nauk SSSR, 1952. 225 p.

(MLRA 6:5)

1. Akademiya nauk SSSR. Otdelenie khimicheskikh nauk.

(Chromatographic analysis)

ROGINSKIY, S.Z.; YANOVSKIY, M.I.

The theory of chromatography on nonhomogeneous surfaces. I. Determination of the distribution function of portions of a solid surface over heats of adsorption from the desorption curves. III. Dynamics of the adsorption of mixtures on heterogeneous surfaces. Bull. Acad. Sci. U.S.S.R., Div. Chem. Sci. '52, 63-8, 69-79 [Engl. translation].
(CA 47 no.20:10310 '53)

ROGINSKIY, S. Z.

USSR/Chemistry - Adsorption   Jan/Feb 52

"The Theory of Chromatography on Nonhomogenous
Surfaces. I. Determination of the Distribution
Function of Portions of a Solid Surface by Heat
of Adsorption Taken From Desorption Curves,"
S. Z. Roginskiy, M. I. Yanovskiy, Inst of Phys
Chem, Acad Sci USSR

"Iz Ak Nauk, Otdel Khim Nauk" No 1, pp 59-63

Studied the effect of energy nonhomogeneities of
the surface on the character of dynamic desorption
curves in chromatographic analysis. Found the

208T4

USSR/Chemistry - Adsorption
                    (Contd)

connection between the form of the desorption
curves and the function of distribution of surface
portions at adsorption temp.   Gives a method for
constructing this function. Obtained eqs of
desorption curves for general forms of distri-
bution. Gives the limits and conditions under
which this method can be used.

208T4

ROGINSKIY, S. Z

USSR/Chemistry - Adsorption   Jan/Feb 52

"The Theory of Chromatography on Nonhomogenous Surfaces. III. The Dynamics of Adsorption of Mixtures on Inhomogenous Surfaces," S. Z. Roginskiy, M. N. Yanovskiy, Inst of Phys Chem, Acad Sci USSR

"Iz Ak Nauk, Otdel Khim Nauk" No 1, pp 64-73

On the basis of the statistical theory, the following results were obtained. The effect of the inhomogeneity of an absorbent on the dynamics of adsorption of a mixt of 2 substances was investigated. Crit data were established, which show that

USSR/Chemistry - Adsorption   Jan/Feb 52
          (Contd)

one dynamic adsorption regime can change to another. The conditions for the complete sepn of a binary mixt were established. Conclusions drawn from this are of particular interest for the dynamics of adsorption in the field of low degs of filling, where the effect of inhomogeneities is generally very pronounced.

208T5

208T5

ROGINSKIY, S. Z.

PA 240T9

USSR/Chemistry - Catalysts   Dec 52

"Classification of the Action of Additives Introduced
Into Catalysts," Corr Mem Acad Sci USSR S. Z. Rogin-
skiy

"DAN SSSR" Vol 87, No 6, pp 1013-1015

An attempt is made to classify catalyst additives
according to the nature of their action. The class-
ification is made under four major headings: class
I - modifier additives, class II - structure-form-
ing additives, class III - stabilizer additives, and
class IV - blocking catalyst poisons.

240T9

1. KRYLOV, O.V., ROGINSKIY, S.Z.

2. USSR (600)

4. Hydrogen

7. Oxidation of hydrogen over platinum activated by oxygen. Dokl AN SSSR   No. 2   1953

9. Monthly List of Russian Accessions, Library of Congress, ___April___ 1953, Uncl.

ROGINSKIY, S. Z.

USSR/Chemistry - Catalysts, Platinum   21 Aug 53

"The Nature of the Activation of Platinum With a
Hydrogen-Oxygen Explosive Mixture," O. V. Krylov,
S. Z. Roginskiy, I. I. Tret'yakov, Corr Mem Acad
Sci USSR

DAN SSSR, Vol 19, No 6, pp 1353-1355

Data obtained by electron-microscopic and electrono-
graphic investigation of Pt surfaces indicate when
collated with kinetic data that increasing porosity
of the surface, occurring as a result of the reac-
tion, has little influence on the activity of the
Pt catalyst. The same applied to the formation of

269T12

Pt_3O_4, which may even reduce the activity when the
quantity of O_2 is large. Activation of Pt during
the reaction takes place as a result of absorption
of O_2 by the metal.

Comparison of the theory of adsorption of gas mixtures on very heterogeneous surfaces with the experimental data in the paper by B. P. Bering and V. V. Serpinskii. S. Z. Roginskii and O. M. Todes. *Zhur. Fiz. Khim.* **27**, 1241-4 (1953).—The expts. by B. and S. (*C.A.* **47**, 4683i) do not contradict the theory of R. and T. (*Problemy Kinetiki i Kataliza* **7**, 136(1949)) because they covered too narrow a range of pressures. J. J. Bikerman

USSR/Chemistry - Isotopes, Cataly-   21 Mar 53
tic Oxidation

"Use of Tracer Carbon to Study the Mechanism of the Catalytic Oxidation of Ethylene Over Silver," S. Z. Roginskiy, Corr Mem Acad Sci USSR, and I. Ya. Margolis, Inst of Phys Chem, Acad Sci USSR

DAN SSSR, Vol 89, No 3, pp 515-517

Used radio-active C^{14} to study the oxidation of ethylene over a silver catalyst. Concluded that formation of CO_2 proceeds in two independent ways: oxidation of ethylene oxide which has formed and conversion of other intermediate products, possibly of the peroxide type.

272T1

ROGINSKIY, S. Z.

272T1

B. T. R.
V. 3 No. 3
Mar. 1954
Corrosion

Mat 3

3133*   Catalytic Corrosion. (Russian.) S. Z. Roginskii, I. I. Tret'iakov, and A. B. Shekhter. *Doklady Akademii Nauk SSSR,* v. 91, no. 4, Aug. I, 1953, p. 881-884 + 1 plate.
Discusses external effect of catalytic and sorption corrosion on surface structure. Table, micrographs. 7 ref.

Roginskiy, S. Z.

Changes in metallic surfaces produced by chemical processes and by heating. S. Z. Roginskii, I. I. Tret'yakov, and A. B. Shekhter. *Doklady Akad. Nauk S.S.S.R.* 91, 1167–9(1953).—Structures similar to those produced by thermal etching were produced at much lower temps. by reactions catalyzed by the metal being studied. Pt that had been used to catalyze the reaction $H_2 + O_2$ for 24 hrs. at 600° was observed with the electron microscope to have a "stepped-terrace" structure with terraces about 1 μ wide. Terraces only about 500 A. wide were observed on Pd heated in vacuum at 1000°. A lamellar structure with a spacing of 200 to 300 A. was observed on Pt [treatment not described]. The observed structures were not caused by local overheating, since a "crater" structure was observed with rapid rates of reaction. At rates that led to the usual terraces, the initial structure was rounded "hills and valleys" of about the same dimensions. The thermodynamic free energy is minimized by structural changes involving the elimination of worked surface metal, the replacement of crystal faces of high energy by those of lower energy, and the coarsening of grains by recrystn. Specific chem. adsorption can lower the surface energy so that the equil. structure may be different in the presence and in the absence of a given substance. Chem. impurities may form an interfering film at cryst. boundaries. A. G. Guy

ROGINSKIY, S. Z.

Chem Abs v48
1 - 25-54
general + Physical
Chemistry

The nature of activation of palladium by oxygen-hydrogen mixtures. O. V. Krylov, S. Z. Roginskiĭ, and I. I. Tret'yakov. *Doklady Akad. Nauk S.S.S.R.* 92, 75-8(1953); cf. *ibid.* 91, 1353(1953); C.A. 47, 5232g.—The previously noted phenomena on the action of H_2 and O_2 on Pt surfaces also occur on surfaces of Pd. The metal is activated by O_2-H_2 mixts. as a result of deep-seated alteration of the surface, with the captured O_2 apparently acting as a surface-modifying admixt. The optimum amt. of O_2 in respect to catalytic activation of Pd appears to be that corresponding to the formation of a monolayer, i.e., an admixt. of a very small percentage of the total compn. On this activation is superimposed the effect of increased activity connected with the increase of the abs. surface due to loosening of the surface of the metal. The phenomenon appears to be general for the noble metals. Electron-microscopic photographs of typical surfaces are shown.   G. M. Kosolapoff

ROGINSKII, S. Z.

Factors that determine the dehydrogenating and dehydrative properties of zinc oxide. The effect of the method of preparation on the catalytic decomposition of isopropyl alcohol. G. M. Zhabrova, L. N. Kutseva, and S. Z. Roginskii. Doklady Akad. Nauk S.S.S.R. 92, 569-72 (1953).—A difference in the method of prepn. of ZnO can produce a considerable difference in its catalytic activity with iso-PrOH. ZnO prepd. by pyrolytic method (from hydroxide, oxalate, carbonate, or nitrate) shows approx. the same activation energy of decompn. of iso-PrOH: 23,000-26,000 cal./mole; the specimens prepd. by direct oxidation of Zn vapor, however, give activation energy 48,000 cal./mole. The sp. surface values of the specimens differ: The prepn. from Zn(NO₃)₂ has 1.6 sq.m./g., that from Zn(OH)₂ 19.6; that from Zn metal 15.46; that from ZnCO₃ 10.4; that from ZnC₂O₄ 14.2. At 296° the most active specimen is that derived from the oxalate, whereas that from metallic Zn is least active. At 366° the differences are less pronounced, at 400° they are all nearly alike and at 450° the specimen from Zn is 2.3 times as active as the oxalate-derived one.   G. M. Kosolapoff

Roginskiy, S. Z.

USSR/Chemistry – General chemistry

Card 1/2   Pub. 40 – 2/27

Authors   : Margolis, L. Ya.; Malyarova, E. P.; and Roginskiy, S. Z.

Title   : The kinetics of oxidation of simple unsaturated hydrocarbons over V-contacts

Periodical : Izv. AN SSSR. Otd. khim. nauk 6, 958-965, Nov-Dec 1954

Abstract   : The order of formation of aldehydes, carbon monoxide and carbon dioxide during the oxidation of propylene over vanadium contacts is described. The reaction activation energies necessary for the formation of aldehydes, CO and CO_2 from simple unsaturated hydrocarbons were determined. The kinetics of decomposition and oxidation of acetaldehyde over V contacts was investigated and the activation energy of these reactions was established.

Institution : Acad. of Scs. USSR, Institute of Physical Chemistry

Submitted   : July 24, 1954

Periodical : Izv. AN SSSR. Otd. khim. nauk 6, 958-965, Nov-Dec 1954

Card 2/2

Pub. 40 - 2/27

Abstract   : The ratio between the activation energies of primary and secondary oxidation reactions makes it impossible to increase the aldehyde content in the reaction products by changing the reaction temperature and the concentration of the reacting substances. Seven references: 6 USSR and 1 English (1934-1954). Tables; graphs.

ROGINSKIY, S. Z.

USSR/Chemistry - Electron phenomena

Card 1/1   : Pub. 124 - 3/24

Authors   : Roginskiy, S. Z., Memb. Corresp. of Acad. of Sc. USSR

Title   : Electron phenomena in catalysis and adsorption

Periodical   : Vest. AN SSSR 9, 17-23, Sep 1954

Abstract   : The problem on whether a direct parallelism exists between electron
               properties of catalysts-semiconductors and their behavior during catal-
               ysis and adsorption and to what extent the ideas of the electron theory,
               developed by Soviet scientists, apply to this problem was debated. The
               progress made by Soviet science, in comprehending the relations of chem-
               ical and adsorption phenomena occurring in catalysis and in understand-
               ing the limitations imposed upon catalysis by thermodynamics, is ana-
               lyzed. The role of surface unsaturated radicals and the possibility of
               plane chains in catalysis are discussed. Eight Russian references
               (1933-1954).

Institution : ...

Submitted   : ...

ROGINSKIY, S.Z., chlen-korrespondent.

Dmitrii Petrovich Konovalov. Nauka i zhizn' 21 no.1:37-38 Ja '54.
(MLRA 7:1)

1. Akademiya nauk SSSR.

(Konovalov, Dmitrii Petrovich, 1856-1929)

Roginskiy, S. Z.

USSR/ Chemistry - Catalysts

Card 1/1   Pub. 151 - 2/36

Authors   :   Zhabrova, G. M.; Roginskiy, S. Z.; and Fokina, E. A.

Title   :   Hydrogen peroxide decomposition catalysts

Periodical   :   Zhur. ob. khim. 24/1, 10-18, Jan 1954

Abstract   :   The catalytic activity of various oxides and salts, with respect to the de-
                 composition of H_2O_2 in aqueous solutions, was investigated. The essential
                 role of the homogeneous catalytic action of the dissolved catalyst in the
                 H_2O_2 decomposition was established. It was found that the catalyst activity
                 depends upon the orientation of the elements and their components in the D.I.
                 Mendeleyevs' periodical system of elements and upon the chemical properties
                 of the solid compound. Catalysts containing transition elements and possess-
                 ing intensive coloration were observed to be more active than noncolored cat-
                 alysts having no transition elements. The effect of free electrons on H_2O_2
                 decomposition is explained. Thirty-two references: 29-USSR; 1-USA; 1-Eng-
                 lish and 1-German (1852-1952). Table; graphs.

Institution :   ...
Submitted   :   July 13, 1953

ROGINSKIY, S. Z.

USSR/Chemistry

Card 1/1

Authors	:	Andianova, T. I.; and Roginskiy, S. Z.
Title	:	Problem concerning the causes hindering the derivation of aldehydes and carboxylic acids through catalytic oxidation of unsaturated hydro-carbons.
Periodical	:	Zhur. Obshchei Khim. 24, Ed. 4, 605 - 610, April 1954
Abstract	:	Using the oxidation of propylene with atmospheric oxygen and silver and vanadium catalysts for soft oxidation of hydrocarbons as an example, the authors explain the origin and characteristics of the intermediate pro-ducts originating in the process of oxidation. The low yields of soft oxidation products may be caused by the fact that aldehydes and acids oxidize readily. The reaction products were analyzed for their content of carboxylic acid by titration in 0.1 % KOH solution and for the aldehyde content by the hydroxylamine method. Complete test results are given in tables. Four references; 2 USSR since 1934; 2 English since 1946. Tables.
Institution	:	Academy of Sciences USSR, Institute of Physical Chemistry.
Submitted	:	October 9, 1953

ROGINSKIY, S. L.
ROGINSKIY, S Z

USSR

Reasons which prevent the preparation of aldehydes and carboxylic acids by catalytic oxidation of unsaturated hydrocarbons. T. I. Andrianova and S. Z. Roginskii, *J. Gen. Chem. U.S.S.R.* 24, 815-18(1954)(Engl. translation).— See C.A. 49, 6431f. H. L. H.

Roginskiy, S. Z.

2013 Electronic Phenomena in Catalysis and Adsorption. Elektronnye iavleniia v katalize i adsorbtsii. (Russian.) S. Z. Roginskii. Vestnik Akademii Nauk SSSR, v. 24, no. 9, Sept. 1954, p. 17-23.

Review of a series of works of Soviet physicists indicating the possibility of a relation between the properties of catalysts and semiconductors. 8 ref.

Roginskiy, S.Z.

U S S R :

Factors that determine the dehydration and dehydrogenation properties of zinc oxide. The effect of adding acids, bases, and salts on the catalytic decomposition of isopropyl alcohol. G. M. Zhabrova, L. N. Kutseva, and S. Z. Roginskii. *Doklady Akad. Nauk S.S.S.R.* 94, 73-6(1954); cf. *C.A.* 48, 5627d.—The effect was detd of adding H_2SO_4, H_3PO_4, H_3BO_3, NaOH, $NaHSO_4$, Na_2SO_4, $MgSO_4$, $Al_2(SO_4)_3$, $ZnSO_4$, or $CuSO_4$ on the catalytic activity of a ZnO, contact in the decompn. of iso-PrOH. The addn. of acids increases the dehydrating action, whereas alkalies decrease it. The effect of salts on the dehydrating action depends on their acid-base properties. The sulfates have the greatest pos. effect. The effect of $NaHSO_4$ has a pos. effect on the dehydration reaction, but a neg. effect on the dehydrogenation reaction. Pure ZnO is primarily a dehydrogenation catalyst but the addn. of compds. can affect its characteristics so that it will act as a dehydration catalyst.

I. Rovtar Leach

ROGINSKIY, S. Z.
USSR/Physical Chemistry

Card 1/1

Authors   :   Margolis, L. Ya., and Roginskiy, S. Z. Memb. corresp. of Acad.
                   of Sc. USSR.

Title   :   The role of aldehydes in catalytic oxidation of unsaturated
                   hydrocarbons

Periodical   :   Dokl. AN SSSR, 96, Ed. 2.   311 - 314, May 1954

Abstract   :   Experiments were conducted to determine the role of aldehydes
                   during catalytic oxidation of olefins over vanadium oxide con-
                   tacts, the most widely known soft oxidation catalysts in chemistry.
                   An analysis of the composition of ethylene and propylene oxidation
                   products which include aldehyde, acids, carbon monoxide and dioxide
                   as well as hydrogen and methane shows that the chemical process is
                   more complicated with vanadium than with silver. Five references;
                   4 USSR. Table, graphs.

Institution   :   . . . .

Submitted   :   February 9, 1954

Roginskiy, S. Z.

The possible role of ethylene oxide in the oxidation of unsaturated hydrocarbons over vanadium contacts. L. Ya. Margolis and S. Z. Roginskii. *Doklady Akad. Nauk. S.S.S.R.* 96, 819-51(1954).—The purpose of the work reported was to elucidate the possible role of ethylene oxide as an intermediate product and the reason for its absence in the products of the oxidation of ethylene over oxides. The oxidation of ethylene oxide and its mixts. with ethylene tagged with C^{14} was carried out under static conditions over V_2O_5 at pressures of about 0.5 mm. and a temp. of 350°. From the distribution of the radioactivity between different products it was possible to follow the transformation of ethylene oxide and olefins in mixts. and to elucidate the genetic relationship of different reaction products. Data are given for a typical oxidation carried out with ethylene, ethylene oxide, and O on V_2O_5 at 350°. From the isotopic data the relative rate of formation of CO and CO_2 from the mixt. of hydrocarbon and ethylene oxide was calcd. And this calcn. showed that the presence of ethylene oxide intensifies the formation of CO from ethylene and retards its complete oxidation to CO_2. The process of oxidation and de-

compn. of AcH in the presence of ethylene oxide on V_2O_5 was also of great interest. CO was formed to an equal extent both from AcH and from ethylene oxide; 80% of the CO_2 was obtained from the aldehyde and 20% from ethylene oxide. The aldehyde was sorbed more strongly on the contact surface than was the ethylene oxide. The ratio of the rates of formation of CO and CO_2 was 3.4 from pure aldehyde, but it was 1.3 with the presence of ethylene oxide. The absolute rate of formation of CO_2 from the aldehyde increased by 2.6 times at a steady rate of CO generation. The ethylene oxide, changing the rate of decompn. of the aldehyde, increases its complete oxidation. Thus was encountered an example of mutual induction of two oxidizing reactions, where their conjugation apparently was connected with the effect on the condition of the contact surface, common to both reactions. Data showed that neither the aldehyde nor the ethylene oxide could be the chief intermediate product of oxidation of unsatd. hydrocarbons, and this might depend either on the absence of stable intermediate products in the process, or on the initial formation of compds. not studied yet, e.g., Ac_2O_3 or MeOH.

Gladys S. Macy

ROGINSKIY, S. Z.

USSR/Chemistry - Catalytic Cracking

Card 1/2

Authors   : Audreyev, E. A., Andianova, T. I., Klimenok, B. V., Krylov,
                O. V., Roginskiy, S. Z., Memb. Corres. of Acad. of Sc.
                USSR; and Sakharov, M. M.

Title   : Radio-chemical investigation of secondary reactions of
                catalytic cracking of hydrocarbons

Periodical   : Dokl. AN SSSR, 96, 781 - 784, June 1954

Abstract   : The radio-chemical methods of investigating the secondary
                reactions of catalytic cracking, consist in the simultane-
                ous introduction into the reactor of the hydrocarbon to be
                cracked, plus one of the cracking products marked with ra-
                dioactive carbon C^{14} and, consequent, radiometric analysis
                of the basic cracking products. Experiments show, that
                the conversion of the hydrocarbon molecules, in conditions
                of catalytic cracking, are not completed during one process

Dokl. AN SSSR, 96, Ed. 4, 781 - 784, June 1954   (Additional Card)

Card 2/2

Abstract   :   of adsorption on the surface of the catalyst. The primary
products of hydrocarbon molecule decomposition become de-
sorbed in the gaseous phase. Three references. Tables.

Institution :   ...

Submitted   : March 9, 1954

ROGINSKIY, S. Z.

USSR/Chemistry - Physical Chemistry

Card	:	1/1

Authors   : Krylov, O. V., Memb. Corres. of Acad. of Sc. USSR., Roginskiy, S. Z. and
Fokina, E. A.

Title   : Investigation of the absorption method characterizing the alkaline pro-
perties of oxide catalysts

Periodical   : Dokl. AN SSSR, 96, Ed. 6, 1183 - 1186, June 1954

Abstract   : In order to investigate the catalytic properties of surfaces, acting ac-
cording to the acid-basic mechanism, one must have proper methods of de-
termining the number and quality of the acid and alkaline centers of the
surface. The most effective methods are those based on the measurement
of the value and stability of specific absorptions for such weak bases
as: ammonia, pyridine, quinoline, and the methods based on the study of
the poisoning effect of alkalis on the activity of catalysts. Twelve
references. Graphs.

Institution   : ...

Submitted   : March 12, 1954

ROGINSKIY, S.Z.

"Mechanism and Kinetics of Isotope Metabolism," edited by A. A. Imshenetskiy,
Corresponding Member, Academy of Medical Sciences USSR, Moscow, Publishing House
Of the Academy of Sciences USSR, 1955, 239 pp

Sum 1467

S. Z. ROGINSKIY
RAZVITIYE ELEKTRONNOGO NAPRAVLENIYA V TEORII KATALIZA (Development
of the electronic theory of catalysis). In Problemy kinetiki i
kataliza (Problems of Kinetics and Catalysis), vol. 8. Izdatel'-
stvo Akademii Nauk SSSR, 1955. p. 5-14.

A survey of the literature on the electronic nature of catalysis
with emphasis on the work of Soviet scientists, starting with
L. V. Pisarzhevskiy, is given.

The First All-Union Conference on Catalysis took place in the
Leningrad Phys. -Techn. Institute with the participation of A. F.
Ioffe, Ya. I. Frenkel', A. N. Terenin, and Ya. G. Dorfman.

The following Soviet scientists and their contributions to the
electronic theory of catalysis are mentioned: Ya. I. Frenkel'
(formulation of the theoretical principles on semiconductors);
I. Ye. Tamm (existence of electron levels on the surfaces of
metals and semiconductors); A. I. Ansel'm (role of quantum-
mechanical effects); V. Ye. Lashkarev, Physical Institute, Ukr.
Acad. of Sciences (experimental study of Tamm's phenomena,

ROGINSKIY, S. Z., Razvitiye elektronnogo . . .   AID 792 - S

see p. 180); V. P. Zhuze, A. R. Regel', I. V. Mochan, and Yu. P.
Maslakovets, Leningrad Institute for Semiconductors (dependence
of electron properties of solid substances on the chemical
composition and structure of binary compounds); A. N. Arsen'yeva
(electron-emission work of semiconductors).

Prior to World War II, the study of electronic phenomena in
catalysis was conducted in Leningrad and Ukraine. At present, the
Physical-Chemical Institute im. L. Ya. Karpov is also participating
very actively in investigation of these phenomena (experiments with
ZnO), (four papers: pp. 34, 43, 165, 204).

A. N. Terenin (heterogeneous photochemical processes); A. T.
Vartanyan and Ye. K. Putseyko (semiconductor properties of some
organic dyes, nature of active centers on some oxide catalysts,
role of the hydrogen bond in specific adsorption); (papers, p. 17,
53); N. N. Semenov, V. V. Voyevodskiy and F. F. Vol'kenshteyn
(free radicals and radical-chain catalysis) (p. 79 and 97); N. N.
Semenov and F. F. Vol'kenshteyn (mechanism of chemisorption on
semiconductors; principles of the chain theory); Ye. I. Shul'ts
and L. M. Sapozhnikov (relation between the electronic properties

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ROGINSKIY, S. Z., Razvitiye elektronnogo . . .   AID 792 - S

of oxides and salts and their catalytic effect on decomposition
of unstable oxygen compounds: KMnO4, HgO, etc.); Tukachinskiy
and A. A. Ravdel' (electric conductivity of NiO); S. Z. Roginskiy,
S. Yu. Yelovich, G. M. Zhabrova and L. Ya. Margolis (catalysts
for oxidation of hydrocarbons); S. Z. Roginskiy, G. M. Zhabrova,
and Ye. A. Fokina (decomposition of hydrogen peroxide); S. Z.
Roginskiy and Ye. I. Shmuk (catalytic effect of cations in the
decomposition of permanganates); A. B. Shekhter (experimental
study of free atoms of hydrogen, oxygen and nitrogen; kinetics
of their recombination); A. A. Ravdel' (electric state of
adsorbed hydrogen atoms and molecules); K. S. Ablezova (contin-
uous and intermittent processes, involving the effect of additives);
L. Ya. Margolis, O. M. Todes and G. M. Zhadbrova (effect of
additives on semiconductors); F. F. Vol'kenshteyn (development of
the electron theory of chemisorption); V. L. Bonch-Bruyevich and
F. F. Vol'kenshteyn (electronic nature of kinetic and adsorption
irregularities) (p. 218); V. B. Sandomirskiy and F. F. Vol'kenshteyn
(space and surface electronic properties of semiconductors) (p. 189).
The work of non-Soviet scientists on the electronic theory of
catalysis by metals and alloys has been reviewed. Application of
the electronic theory of catalysis to various fields is discussed and
several problems needing further investigation are pointed out.
                                3/3

AF701597   TREASURE ISLAND BOOK REVIEW   AID 804 - S

ROGINSKIY, S. Z. (Institute of Physical Chemistry, Academy of Sciences, USSR).
   DISKUSSIYA (Discussion). In Problemy kinetiki i kataliza
   (Problems of Kinetics and Catalysis), vol. 8. Izdatel'stvo
   Akademii Nauk SSSR, 1955. Section I: Effect of illumination
   on the adsorbability of solids. p. 74-75.

A rather important discovery was made by A. A. Terenin, namely
the unexpectedly small amount of energy transferred from the sur-
face atom to the lattice of the metal. The assumption that mole-
cules with excess energy exist on the entire surface on some
parts of it indicates the existence of labile radicals or chains
in heterogeneous catalysis. Molecules on the surface in meta-
stable states may appear due to some peculiarities in the structure
of active centers which transfer the energy to the lattice poorly.

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Roginskiy, S. Z.

AF701597   TREASURE ISLAND BOOK REVIEW   AID 808 - S

ROGINSKIY, S. Z. (Institute of Physical Chemistry, Academy of Sciences, USSR)
OB ELEKTRONNOM MEKHANIZME OKISLITEL'NO-VOSSTANOVITEL'NOGO KATALIZA (Electron mechanism of oxidation-- reduction catalysis). In Problemy kinetiki i kataliza (Problems of Kinetics and Catalysis), vol. 8. Izdatel'stvo Akademii Nauk SSSR, 1955. Section II: General problems of the theory of catalysis. p. 110-140.

The author differentiates two groups of catalytic reactions: 1) oxidation-- reduction reactions with catalysts possessing electronic characteristics - metals and semiconductors; and 2) reactions of the acid-base type which comprise diverse reactions; the catalysts are mineral acids, bases, salts. The oxidation - reduction reactions in the presence of electron conductors and metals are compiled in Table I (p. 111-112). Reactions accelerated by catalysts of the acid-base type (oxides, bases, salts) are compiled in Table 2 (p. 114). The selection of catalysts for oxidation - reduction reactions (p. 115-117) and their electronic characteristics (p. 117-121) are discussed. Catalysts for decomposition of H_2O_2 are compiled in a table (p. 118). The mechanism of oxidation - reduction catalytic reactions, --- namely, decomposition of unstable oxygen compounds

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SANDOMIRSKIY, V.B.; KRASIL'SHCHIKOV, A.I.; BONCH-BRUYEVICH, V.L.;
    SLIN'KO, M.G.; ROYTER, V.A.; YELOVICH, S.Yu.; VOYEVODSKIY, V.V.;
    BALANDIN, A.A.; ROGINSIY, S.Z.; SEMENOV, N.N.

Discussion. Probl.kin.i kat. 8:145-162 '55.   (MLRA 9:5)

1. Institut fizicheskoy khimii AN SSSR (for Sandomirskiy, Royter,
Yelovich, Roginskiy); 2. Gosudarstvennyy institut azotnoy promy-
shlennosti (for Krasil'shchikov); 3. Moskovskiy elektrotekhni-
cheskiy institut svyazi (for Bonch-Bruyevich); 4. Fiziko-khimiche-
skiy institut imeni L.Ya. Karpova (for Slin'ko); 5. Institut
khimicheskioy fiziki AN SSSR (for Voyevodskiy, Semenov); 6. Insti-
tut organicheskoy khimii AN SSSR (for Balandin).
                        (Catalysis)

Roginskiy S, Z,

AF701597   TREAUSRE ISLAND BOOK REVIEW   AID 818 - S

ROGINSKIY, S. Z. (Institute of Physical Chemistry, Academy of Sciences, USSR).
DISKUSSIYA (Discussion). In Problemy kinetiki i kataliza (Problems of Kinetics and Catalysis), vol. 8. Izdatel'stvo Akademii Nauk SSSR, 1955. Section II: General problems of the theory of catalysis. p. 157-161.

Vol'kenshteyn's paper is discussed at some length and some of his theories criticized. The terminology used in discussing work on catalysis is not exact   and impairs the development of the concept of chain catalysis. Voyevodskiy does not take into consideration the occuring ionization and polarization, although they play an important part in catalysis.

A. A. Balandin's classification of catalytic reactions is based on the difference between the radical and ionic mechanisms of the process. The author discusses his own classification based on the selection of catalyst and types of particles, the migration of which causes activation of the substrate. The mechanism proposed by the author for the catalytic decomposition of H_2O_2 is not a chain mechanism; the mechanism of the catalytic

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ROGINSKIY, S. Z., Diskussiya

AID 818 - S

decomposition of H_2O_2 and of the oxidation - reduction of ions shows that along with adsorption processes purely electrochemical reaction take place, with transfer of electrons through the conductor.

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AF701597   TREASURE ISLAND BOOK REVIEW   AID 826 - S

ROGINSKIY, S. Z. (Institute of Physical Chemistry, Academy of Sciences,
     USSR)
DISKUSSIYA (Discussion).   In Problemy kinetiki i kataliza (Problems
of Kinetics and Catalysis), vol. 8. Izdatel'stvo Akademii Nauk
SSSR, 1955. Section III: Connection between the electric con-
ductivity and catalytic activity of semiconductors. p. 200-201.

The paper presented by K. I. Matveyev and G. K. Boreskov is
reviewed and the interesting fact is mentioned that there is no
simple relationship between the changes in electrical conductivity
and in catalytic activity and that, as a rule the electric con-
ductivity changes to a higer degree than the catalytic activity.
S. Z. Roginskiy compares the experimental data obtained by K. I.
Matveyev and G. K. Boreskov with a recently published American
paper on hydrogenation of ethylene on zinc oxide at low temper-
atures E. H. Taylor and J. A. Wethington, J.A.C.S. $\underline{76}$, 971
(1954).

Another interesting fact was established by S. Ya. Pshezhetskiy
and I. A. Myasnikov, namely that marked changes were observed in
the behavior of zinc oxide which were caused by small amounts of

1/2

POGINSKIY, S. Z., Diskussiya   AID 826 - S

    adsorbed oxygen or hydrogen. The effect of oxygen is not
suppressed by even a large excess of hydrogen.

2/2

BALANDIN, A.A.; BORESKOV, G.K.; VOL'KENSHTEYN, F.F.; KAVTARADZE, N.N.;
ROGINSKIY, S.Z.; KEYYER, N.P.; BONCH-BRUYEVICH, V.L.

Discussion. Probl.kin.i kat. 8:233-240 '55.   (MLRA 9:5)

1. Institut organicheskoy khimii AN SSSR (for Balandin); 2. Fizi-
ko-khimicheskiy institut imeni L.Ya. Karpova (for Boreskov);
3. Institut fizicheskoy khimii AN SSSR (for Vol'kenshteyn, Kavta-
radze, Roginskiy, Keyyer); 4. Moskovskiy elektrotekhnicheskiy
institut svyazi (for Bonch-Bruyevich).
            (Adsorption) (Catalysts) (Surface chemistry)

AF701597   TREASURE ISLAND BOOK REVIEW   AID 838 - S

ROGINSKIY, S. Z. (Institute of Physical Chemistry, Academy of
    Sciences, USSR).
    DISKUSSIYA (Discussion). In Problemy kinetiki i kataliza (Prob-
    lems of Kinetics and Catalysis), vol. 8. Izdatel'stvo Akademii
    Nauk SSSR, 1955. Section IV: Nature of the active surface,
    p. 237-238.

    The theory of adsorption developed by F. F. Vol'kenshteyn and
    V. L. Bonch-Bruyevich refers to the equilibrium of free hydrogen-
    like atoms on surfaces of semiconductors. The bonds between
    atoms and crystals, may be one-electron, two-electron or ionic.
    In the electronic theory of chemisorption, the adsorbed atom is
    combined with the conductivity electron or electron hole. The
    number of initial adsorption centers is equal to the number of
    electrons and holes present on the surface of the semiconductor.
    During the adsorption, the number of centers increases due to
    dissociation.

                              1/1

ROGINSKIY, S.Z.

U S S R .

10297* Ionic Bond in Chemical Adsorption on Semiconduc-
tors. O ionnoi sviazi pri khimicheskoi adsorbtsii na polu-
provodnikakh. (Russian.) F. F. Vol'kenshtein and S. Z. Rogin-
skii. Zhurnal Fizicheskoi Khimii. v. 29, no. 3, Mar. 1955, p.
485-495.

Acceptor-donor properties of adsorbed atom; transition phe-
nomena. . . . . Graphs,

ROGINSKIY, S.Z.

Use of molecular sorption for investigating the state of additions introduced in a catalyst. G. M. Zhabrova, S. Z. Roginskii, and E. A. Fokina (Inst. Phys. Chem., Acad. Sci. U.S.S.R., Moscow). Zhur. Fiz. Khim. 29, 558-65 (1955); cf. C.A. 49, 7348o.—Three MgO-SnO₂ adsorbents were prepd., one (I) by soaking MgO with a soln. of Ph₄Sn and heating, another (II) by soaking MgO with aq. soln. of SnCl₂, treating with Na₂CO₃, and heating, and the 3rd (III) by simultaneous pptn. of Mg and Sn solns. with Na₂CO₃. The adsorption capacity of I and II for N₂ at -183° and heptane at 15° was greater the greater the percentage of SnO₂. Thus, the calcd. surface area of I was 18, 36, and 76 sq.m./g. for 0, 0.09, and 0.3% SnO₂, resp. The frequency distribution of pores (from the desorption curve of heptane) showed but weak maxima between the diams. 0 and 300 A. for pure MgO, whereas I (with 3.3% SnO₂) had a max. of frequency near 20 A. The adsorption capacity of III was almost independent of the concn. of SnO₂ (up to 6%), the calcd. surface was near 110 sq.m./g., and the frequency distribution of pore diams. had a max. near 20 A. at all SnO₂ contents. When the concn. of SnO₂ was ~3%, x-ray diffraction showed that SnO₂ crystals were present. Presumably, in I and II, a part of SnO₂ formed a Mg stannate which remained in the surface and caused increase of its area, whereas in III the SnO₂ was hidden in the grains of MgO and had no effect on their surface.

                                            J. J. Bikerman

ROGINSKIY S. Z.

USSR/ Chemistry - Physical chemistry

Card 1/1   Pub. 147 - 20/21

Authors   : Roginskiy, S. Z.; Tret'yakov, I. I.,; and Shekhner, A. B.

Title   : Discussion on catalytic corrosion

Periodical : Zhur. fiz. khim. 29/10, 1921-1923, Oct 1955

Abstract   : In connection with a report by G. Carton and J. Turkevich in the "Journ de
              chim. phys." 1954, the authors conducted a lengthy discussion and quoted
              numerous experimental data on catalytic corrosion. Twenty references:
              16 USSR, 2 USA, 1 French and 1 Germ. (1934-1954). Illustrations.

Institution : Acad. of Sc., USSR, Inst. of Phys. Chem., Moscow

Submitted   : May 16, 1955

ROGINSKIY, S.Z.

USSR/ Chemistry - Catalysis

Card 1/1   Pub. 22 - 23/54

Authors   : Roginskiy, S. Z. Memb. Corresp. of Acad. of Sc. USSR.; Tretyakov, I. I.;
              and Shekhter, A. B.
Title   : Catalysis over monocrystals

Periodical : Dok. AN SSSR 100/3, 487-490, Jan 21, 1955

Abstract   : The oxidation of hydrogen, methanol and the decomposition of isopropyl
              alcohol and methanol were investigated to compare the activity of Cu-
              crystal facets of various indices. The conversion percentage in all
              investigated cases was found to be insignificant. According to electron
              microscopic observations the catalytic corrosion was very low and has
              no effect on the catalytic activity of the nonocrystals. The results
              obtained for various reactions are tabulated. Seven references: 5 USA
              and 2 USSR (1947-1953). Table, drawing.

Institution : Academy of Sciences USSR, Institute of Physical Chemistry

Submitted   : August 7, 1954

ROGINSKIY, S. Z.

USSR/ Chemistry - Physical chemistry

Card   1/1   Pub. 22 - 26/49

Authors   :   Roginskiy, S. Z. Member Corresp. of Acad. of Sc. USSR

Title   :   The kinetics of isotopic exchange

Periodical   :   Dok. AN SSSR   100/5, 939-942, Feb 11, 1955

Abstract   :   The laws governing the kinetics of a noncomplicated isotopic exchange
in dynamic conditions are discussed., It was established that isotopic
exchange causes no changes in the total number of molecules, in the
chemical phase composition nor in the intermolecular reaction within
the latter and the volume of any investigated system remains strictly
constant. It was found that the analysis of isotope exchange kinetics
in dynamic conditions is not in the least more complicated than in
static conditions and offers the very same possibilities of under-
standing the mechanism of the isotopic exchange process. Seven
references: 5 USSR, 1 French and 1 USA (1936-1952).

Institution :   Academy of Sciences USSR, Institute of Physical Chemistry

Submitted   :   August 7, 1954

ROGINSKIY, S.2

USSR/Physical Chemistry - Crystals, B-5

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 60882

Author: Roginskiy, S. Z., Tret'yakov, I. I.

Institution: None

Title: On Some Phenomena Observed at the Surface of a Tungsten Mono-
crystal in an Electron Microscope-Projector in the Presence of
Gases

Original
Periodical: Dokl. AN SSSR, 1955, 105, No 1, 112-114

Abstract: Studied were the effects of O_2, H_2 and He, introduced into the
flask of an electron microscope-projector, on the images of ▓▓▓
W-points. The points were purified by heating to 2,500° K at
pressure 10^{-10} mm kg. O_2 and H_2 were introduced into apparatus
by breaking sealed capillaries filled with these gases. To a
pressure of 5.10^{-8} mm kg there was observed decreased intensity
of emission of electrons. At higher pressures (up to 5.10^{-6}) on
the screen appeared circular light spots the time of persistence

Card 1/2

USSR/Physical Chemistry - Crystals, B-5

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 60882

Abstract: of which varied from 0.1 to several times 10 seconds. The as-
sumption is made that occurrence of these spots is connected
with adsorption of individual molecules of the gas. ⬛ intro-
duced into the system through heated glass wall ⬛ not produce
this effect.

Card 2/2

ROGINSKIY, S. Z.

10488   AEC-tr-2873

THEORETICAL PRINCIPLES OF ISOTOPE METHODS FOR INVESTIGATING CHEMICAL REACTIONS. (Teoreticheskie Osnovy Izotopnykh Metodov Izucheniya Khimicheskikh).
S. Z. Roginskii (Roginsky). Translated from a publication of the Academy of Sciences U. S. S. R., Moscow, 1956. 456p. $2.20(OTS).

The applications of isotopes in investigations of the mechanisms of chemical transformations and of the reactivity of substances are reviewed. Topics discussed in detail include: thermodynamic isotopic effects, the kinetics of uncomplicated isotopic exchange, mechanisms and stages of isotopic exchange, isotope effects in chemical kinetics, the kinetics of complicated isotopic exchange, and the main fields of application and development prospects of isotope methods in chemical kinetics. Appended are tables of thermodynamic functions of isotopic molecules, equilibrium constants for isotopic exchange, and data on kinetic isotopic
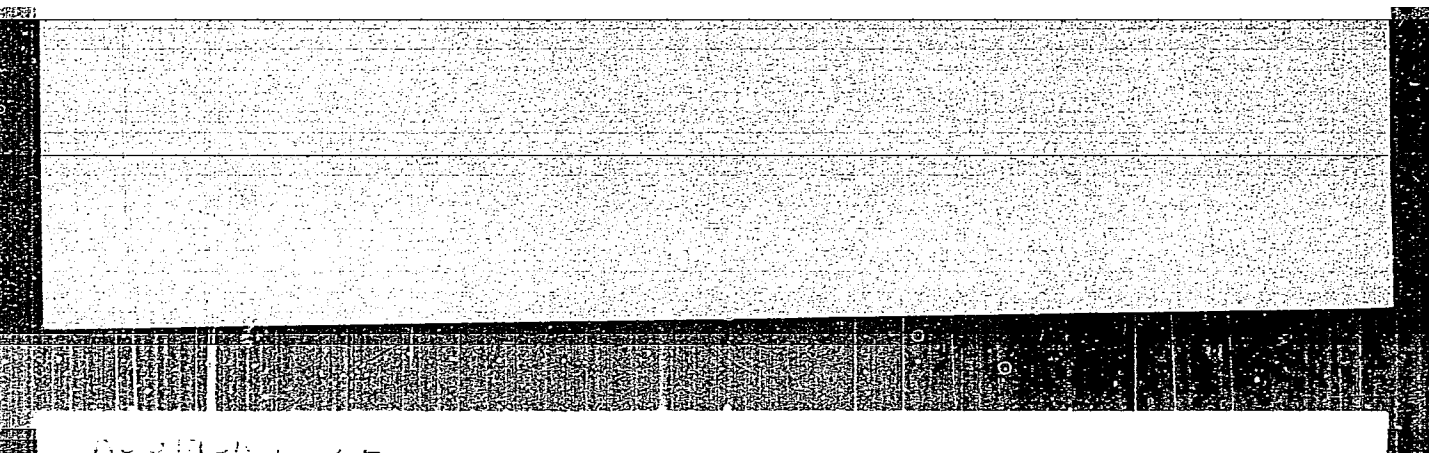
ROGINSKIY S.Z.

Dependence of the catalytic activity of binary compounds of Group II metals with nonmetals on the position of the elements in the Mendeleev periodic system. I Catalytic decomposition of isopropyl alcohol on alkaline earth oxides

ROGINSKY, S.Z. and KRYLOV, O.V.

Possible Mechanism of the Catalytic Oxidation of Hydrogen on Metals.

Iz. Ak. Nauk SSSR. Otdel. Khim
Nauk, No. 2, 1956, pp 139

Translation 564938C

ROGINSKIY, S Z.

USSR/Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry.
Catalysis, B-9

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61093

Author: Krylov, O. V., Roginskiy, S. Z.

Institution: None

Title: Concerning the Possible Mechanism of Catalytic Oxidation of
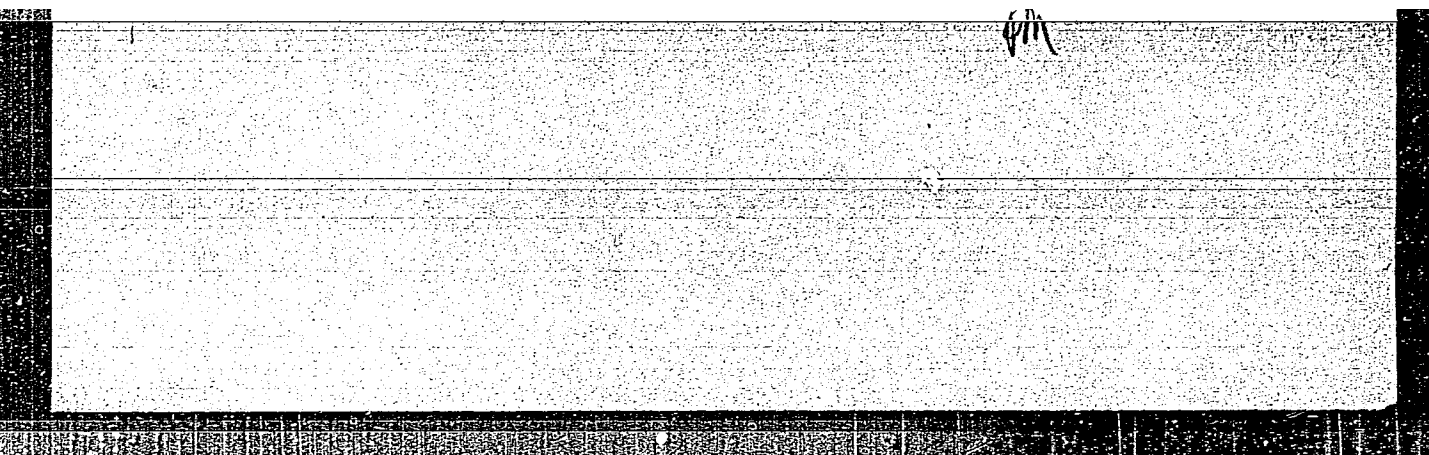Hydrogen on Metals

Original
Periodical: Izv. AN SSSR, Otd. khim. n., 1956, No 2, 145-149

Abstract: Presented is a summary of principal results of studies of kinetics
of oxidation of H_2 on Pt. It is assumed that the sta■■which limits
the process of oxidation of H_2 on Pt is the adsorption of O_2 without
breach of molecules into atoms. Oxygen having undergone strong
surface combination (probably in the form of ions) with the partici-
pation of d-electrons of Pt is not reduced by H_2 but activates Pt
as concerns the reaction of oxidation of H_2. H_2 is adsorbed at
these active centers of Pt, reversibly poisoning them. The

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USSR/ Physical Chemisty - Kinetics. Combustion. Explosives. Topochemistry.   B-9
              Catalysis

Abs Jour   : Referat Zhur - Khimiya, No 4, 1957, 11284

Author   : Krylov O.V., Roginskiy S.Z., Fokina Ye. A.
Inst   : Department of Chemical Sciences, Academy of Sciences USSR
Title   : Study of the Dependence of Catalytic Activity of Binary Compounds of
             Metals of the Second Group with Non-Metals Upon the Position of Elements
             in the Periodic System of Mendeleyev. Communication 1. Catalytic Decom-
             position of Isopropyl Alcohol over Oxides of Alkaline-Earth Metals.

Orig Pub   : Izv. AN SSSR, Otd. khim. n., 1956, No 6, 668-675

Abstract   : In a flow-unit, at 314-$460°$, a study was made of decomposition of isopro-
             pyl alcohol in the presence of the catalysts CaO (I), SrO (II), BaO (III),
             $CaCO_3$ (IV), $BaCO_3$ (V) or $Ca(OH)_2$ (VI). In the I-III series catalytic ac-
             tivity of the oxides increases. Over all the oxides dehydrogenation of
             alcohol predominates over the dehydration. Energies of activation E of
             dehydrogenation (in cal/mole), I 12000-16000, on II 11000, on III 6000.
             Values of E of dehydration are higher (in cal/mole): on I 22000-26000,
             on II 25000, on III 12000. At the same time E values of dehydration

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USSR/ Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry.   B-9
                  Catalysis

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over carbonates (24000 on IV, 17000 on V) are lower than dehydrogenation E values (39000 on IV, 26000 on V) and approximate the dehydrogenation E over oxides. On the basis of these data the assumption is made concerning the presence in oxides of carbonate admixtures which cause the dehydration. Dehydrogenation E over VI, of 16000 cal/mole, is close to dehydrogenation E over I. Literature data concerning catalytic properties of solid alkalies indicate widespread use of alkaline catalysis.

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